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137 *riarz*, a cedar, growing very tall and straight. Its sweet-smelling wood is valued by carpenters and cabinet-makers.

[314] *amerzi*, another cedar, with very volatile reddish wood. Its pitch and resin are used as medicine.

rkanus, a similar tree, considered by the Riffians to be the female of the *amerzi*.

The cedars, generally known under the name of *thuya*, or *arbor vitae*, form the characteristic coniferous vegetation of North Africa.[1]

Other Trees

[262] *rbejuth*, an evergreen oak, with edible acorns.

tashta, another species of oak, with inedible acorns.

rbejuth n yirif, the so-called pig-oak. Its acorns are eaten by wild boars, but not by men on account of their bitter taste. Justinard lists as oak *adren*, calling *abedjoud* the acorn.[2] The latter word is derived from the Arabic *el-bellut*, the difference in renderings being due, aside from different techniques in transcription, to my retention of the *r*, the berberization of the Arabic definite article, in the Riffian dialects. I have always heard it pronounced with the *r*. Hanoteau and Letourneau [3] identify five oaks in Algeria: *Quercus castaneaefolia C. A. Mey.*, *Q. Mirbeckii Dr.*, *Q. Ilex L.*, *Q. Ilex var. Ballota*, and *Q. Suber L.*

[245] *adheman*, the hawthorne. This tree is used as a base for grafting pear and apple shoots. Hanoteau and Letourneau give *Crataegus Oxyacantha* (three varieties), *Cr. Azarolus*, and *Cr. monogyna* for Algeria.[4] Laoust identifies *Cr. Oxyacantha* in Morocco.[5]

[262] *asanu*, the arbute, or strawberry tree. Its fruit is eaten fresh, and also dried and put into bread; the wood is used in house construction. Laoust finds it in other parts of Morocco, and gives it the botanical name *Arbutus unedo*.[6]

[262 388] *fathis*, a large tree bearing a small red fruit, which is eaten. The ashes of its wood are mixed with water, in which grapes are washed before being set out to dry. These ashes are also used as soap in washing cloth. Westermarck [7] calls this the lentisk, *Pistacia lentiscus*.

azemmur, the wild olive. Its fruit is not eaten, but its wood is used in making spoons, ploughs, and other objects.

[245] *thazemmurth*, the female of the *azemmur*, smaller than the male. The male can be used for grafting domestic olives, but the female is never used for this purpose.

za'arur, a large tree with perennial foliage. It bears a seed containing a red liquid. The wood of this tree was formerly used for gunstocks.

thaghieshth n wushun, a species of wild walnut, called jackal-walnut.

afesas, perhaps a spurge-flax, or broom. It is a bush with a red flower, growing in valley bottoms. Laoust gives *Daphne Gnidium L.* for *walesas*.[8] Hanoteau and Letourneau name three species, *Daphne oleoides Schreb.*, *D. Gnidium L.*, and *D. Laureola L.*, for Algeria.[9] This plant has been mistaken by other botanists for an osier, on account of its extensive use in basketry.[10]

thabgha, a wild blackberry. Justinard affirms this designation.[11]

[1] Justinard, p. 159; Hanoteau and Letourneau, p. 69; el Bekri (tr. Macguckin de Slane), p. 15 n.
[2] Page 117. [3] Page 119. [4] Pages 48, 89. [5] Page 309.
[6] Pages 483–484, 519. [7] Edward Westermarck, *Ritual and Belief in Morocco*, vol. II, p. 185.
[8] Pages 515–516. [9] Page 116. [10] Laoust, pp. 515–516. [11] Page 142.

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241 Riffian acquisition of vegetable food may be divided into four processes, some of which may be developmental stages, and all of which are in contemporaneous use.

1. The gathering of edible wild plants.
2. The care of fruit and nut-bearing trees and of vineyards.
3. The care of gardens.
4. The cultivation of grains and leguminous plants.

The following subjects also pertain to agriculture and vegetable food-getting.

1. A calendric cycle of agricultural events.
2. Tools and machinery.
3. Communism in agriculture.

222 137 **Collecting and Gathering.** There are certain wild products growing on mountains, in valleys, in springs, and on refuse heaps, which are of food value and are collected and eaten, either from choice or as emergency rations in time of famine, although no attempt is made to cultivate them. So far as can be determined, they are as follows.

azemmur,[1] the wild olive.

erbejuth,[1] the oak. Both acorns and the tree upon which they grow are called by the same name.

adheman,[1] the hawthorne. The haws, called *saaror*, are gathered and eaten.

larnej,[2] a wild lemon tree, probably escaped from cultivation.

tuth,[2] the mulberry, at present wild. It was probably introduced earlier and then abandoned.

[245] *habb ul muluk*,[2] the wild cherry, with probably the same history as the mulberry. Both trees are now cultivated by the Senhaja.

sasanu,[1] the arbute, or strawberry-tree. Its fruit is eaten fresh, also dried and put into bread.

thabgha,[1] wild blackberries.

tuzzelt,[1] a bush the pod of which is eaten.

thakhfar,[1] a wild rose, the pod of which is eaten.

askum, wild asparagus.

ma'ishk, the wild tomato, found in old refuse heaps. Its cultivation has been abandoned.

thehiseth,[3] a plant growing in the mountains; eaten as a green.

yanush, watercress, or a very similar plant.

thezhiuma, another water plant, growing in springs.

thafa ikshuth, a wild plant resembling celery.

thighigheshth,[4] a wild plant the roots of which are boiled and used for washing wool. Its leaves are cut up, boiled, and eaten.

benaaman, a wild poppy. Women eat its leaves, and children its buds.

imzwar, a plant resembling shamrock or clover. Its leaves, slightly sour in taste, are eaten.

tuasrin, mushrooms.

[1] See Introduction, p. 8.

[2] The wild lemon, cherry, and mulberry were not mentioned in the Introduction because they are not indigenous.

[3] This is perhaps related to the root given by Laoust (p. 506) for mallow. *Tibidus*, in the Zemmour dialect, is the closest.

[4] Laoust (p. 39) suggests that this may be *Saponaria rubra*.

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The gathering of wild vegetable products is traditionally considered to antedate agriculture. Tales are told of the times when the Riffians subsisted on these products and game alone. In Ktama, where agriculture is difficult, the gathering of wild plants, especially *tuzzelt*, forms an important occupation. At the end of winter, when the dried fruit is gone and when the larders are low, many Riffian families would die of hunger if their womenfolk did not go out on the mountain slopes and up the watercourses looking for these natural foods.

The green plants, such as watercress and asparagus, are subject to a dietary sex tabu. Woman only may eat them. The reason given for this distinction is that they produce blood, fat, and soft flesh, desirable in women but not in men.

Mulberries and cherries were probably introduced by the Arabs and later abandoned. Mulberries are not considered good food and are seldom eaten except through necessity. Tomatoes were probably introduced from Spain and then given up.

Cultivation of Fruit and Nut Trees and of Vineyards. *zilon* (male), *misola* (female), the domestic olive tree. The male tree produces large olives low in oil content, which are preserved in lemon juice and eaten as a relish. The fruit of the female tree is pressed into oil. As a rule all the male trees in an olive yard are cut down with the exception of one, which is left to fertilise the female trees. The olives are called by the names of the trees which bear them.

arman, the pomegranate tree. The Riffians recognize sex differences in pomegranates, considering that the fruit with a thick skin and large, hard seeds in the granules is produced by the male tree, whereas the better fruit is produced by females. As a rule, the male trees are all cut down but one, which is left for fertilising the others. Sometimes male trees are left, so that the fruit may be sold in markets frequented by people unacquainted with the difference. The fruit and tree bear the same name.

er ghas, the fig tree. There are four varieties of fig trees, *aseiri*, *aghudani*, *awar n aksi*, and *abaran*. The fruit borne by the *aseiri* is round, with longitudinal purple and green lines; that of the *aghudani* is long, pear-shaped, and purple; that of the *awar n aksi* is round and light green. There are two varieties of *abaran*, one of which is round and green and the other long with black or purple lines. The three first varieties bear twice a year, in June and in September. The June figs, called *er bashor*, are eaten but not dried, except for use as medicine, since they contain but little sugar. The September figs, called *thezath*, are dried. The *abaran* varieties bear only in September. The Riffians say that the *abaran* types are the only indigenous strains, and that the *aseiri* and *awar n aksi* came originally from the Arabs, whereas the *aghudani* is derived from the Negroes.

shukwar, a wild fig. Planted, it is said, by birds that have eaten cultivated figs, this fruit is useless for eating, but is employed for magical purposes. Each year the women and children go out and gather the wild figs when ripe, tie them together in pairs with grass, and hang them on the branches of the domesticated fig trees. There are said to be insects in the wild figs which come out and touch the buds of the domestic figs. It is thought that if these wild figs were not so hung and if the insects from them did not touch the buds, the cultivated figs would not bear.[1]

[1] Westermarck (p. 190) states that the Riffians hang male figs in female trees, in order to fertilise their fruit. A small insect, *Blastophaga grossorum*, bores in and out of the figs, fertilising them. Westermarck refers to Elfving's *De Viktigaste Kulturväxterna* (Helsingfors, 1895), p. 74.

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245 242 *lishin*, the orange tree. Riffian oranges are of the common North African variety. Tangerines are not grown in the Rif. It is said that the fruit of the male orange tree is elongated, while that of the female tree is round. Orange shoots are grafted to wild lemon trees without distinction of sex.

limon, the cultivated lemon tree, as distinguished from the wild variety.

tifah, the apple tree. Riffian apples are small and stunted, and not very palatable. They are not commonly grown except in the highest mountain tribes. The apple shoots are frequently grafted onto hawthornes. A sex distinction is made between the apples: the male ones are said to be large and white, and the females red.

firas, the pear tree. It is said that the male pear is white, while the female is reddish. Grafting onto hawthorne is common.

thaghieshth, the walnut tree. Walnuts are called *nue n thaghieshth*. The Riffians distinguish male from female walnut trees as follows: The male tree bears a hard-shelled nut with little meat; the female's nut is thinner shelled and meatier. Usually the males are cut down to make room for others. No grafting is attempted with walnuts.

juz, the almond tree. The nuts from this tree are called *nue*, the same word which is applied to walnuts. It is said that the male almond bears a nut with a single meat, while the meat of the female is double. Almonds, like walnuts, are not grafted.

er mishmesh, a species of plum tree. The sex of plums is distinguished by breaking the stone and tasting the meat inside. If it is bitter the tree bearing it is supposed to be male. Plums, like apples and pears, are grafted to the hawthorne.

er barkok, the apricot tree. Males are said to have thick skins, and females thin ones. Males are preferred for export, and females for drying.

er khok, the peach tree. The Riffians do not distinguish sex in the peaches, and do not attempt to graft them.

[262] The Riffian prizes his fruit and nut trees highly, perhaps even more than his grain and vegetables, since on the dried fruit of these trees and upon raisins his family is often forced to subsist for months at a time during the winter. He digs around and manures the roots of the trees every spring, and leads irrigation ditches to their trunks. He keeps them carefully pruned and trimmed, and diligently removes insect parasites from leaves and branches.

262 831 [585] Not only does the Riffian take great pains to distinguish between the sexes of the trees, but he also imposes a sex tabu upon the eating of the fruit of two of them, walnuts and almonds. Walnuts may be eaten only by women, and almonds only by men. The reason for this is symbolically sexual, since walnuts, on account of their wrinkled appearance, are supposed to produce a drying and shrinking, whereas almonds are supposed to produce fluidity and potency in men. Both walnuts and almonds consequently play a prominent part in the wedding diet.

Vineyards. Grapes are as important to the Riffians as fruits and nuts. Those grown in the Rif are a large reddish-purple variety, resembling Malaga grapes in form and in taste. They are grown on vines set out on high mountain slopes too steep and too barren for the cultivation of anything else. The vines are kept trimmed, and in spring the soil about their roots is loosened. It is seldom possible to irrigate them, although fertilizer is brought laboriously uphill when possible.

Among the Beni Bu Nsar, Beni Seddath, and Beni Khennus, and in Taghzuth, another variety of grapes is grown, smaller and bluish-purple in color. These grapes are hardier

1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

245 than the Riffian variety. They are grown on trellises outside of and trailing onto the houses, and along the village paths. Since they are trained to climb up trellises, they are not cut back like the Riffian grapes, but are allowed to grow as long as they will, for purposes of shade.

Cactus. The one species of cactus found in the Rif, the prickly pear variety, is called by its Arabic name, *karamus en Nsara*, or the Christian fig. It is found along the seacoast, in the eastern tribes up to Beni Tuzin and Gzennaya, and in the southern part of Gzennaya. It is absent in northern Gzennaya, in southern Beni Urriaghel, in Beni Amart, and in the Senhaja Sghir. Where it is grown it serves as a convenient fence about the house, and as a [438] supply of mediocre food in time of famine. Women and young girls pick its fruit, remove the needles, and sell it in market at a low price.

244 **Garden Plants and Care of Gardens.** *batata*, the potato. This vegetable is obviously of American origin, although it has been grown for a long time in the Senhaja and central Rif and has become an integral part of the local culture. It is divided into two varieties: the reddish type, the more frequent, and the white type, found chiefly in Beni Amart. The white is considered the older. Potatoes are grown only where there is irrigation, and then usually in terraces.

er khizzu, the carrot. This vegetable, considered to be of Arab introduction, is not favored and is rarely grown.

er bser, the onion. This is planted in the following manner: in March onions are cut in two or more pieces lengthwise and planted; these pieces are allowed to grow big and go to seed, and the seeds are collected and sown in a starting-bed in August: the next year the stalks are cut off and the plants are separated and transplanted.

jifth, the white turnip.

er firfir, the pepper. Peppers are specially treated, being fertilized with goat manure when they begin to flower.

jubahth, a species of small bean.

ibauen ibershanen, black beans.

thakhseshth, a type of vegetable marrow or squash.

thakhseshth n yieri, the gourd, raised for bottles only and not eaten.

243 **Cultivation of Grains and Leguminous Plants.** *dra thesdat*, durra, is considered by the Riffians to be of recent introduction from the Negro country. It is grown only by men who have no terraces whereon to grow maize (*dra*), since it can be grown dry. It is not greatly valued and is not commonly grown.

shinti, rye,[1] is grown without irrigation on the mountain slopes where the land, too steep for ploughing, may be worked with the hoe. It may be grown on land which does not belong to the farmer, beyond the reaches of ordinary agriculture, and hence is an important source [262] of food supply for families owning insufficient arable land. The Riffians prize rye highly, considering it rich in food value and a strength producer. Since the Arabs ridicule them for eating it, the Riffians seldom discuss the subject with strangers, or produce food made from

[1] Samples of *shinti* from Gzennaya, now in the Harvard Botanical Museum, have been identified by F. Tracy Hubbard of the Harvard Botany Department as rye. Moulieras mentions *shinth* in his description of the Beni Bu Nsar, calling it "une sorte de blé blanc." Procopius ascribes the cultivation of a grain called Dopa to the mountain Berbers of his time. This grain, identified with the Latin *arinca*, was perhaps rye. Moulieras, *Le Maroc Inconnu*, vol. I, p. 55: Procopius, bk. IV, chap. 6, l. 13; Freund, Latin-English Lexicon; Liddell and Scott's Greek-English Lexicon, unabridged, 1882 edition: Vavilov, *The Origin of Cultivated Plants*, p. 266.

796 [182] The 24th of June, or Midsummer day (Old Style), is called in Arabic l-'ansara (l-ansra); and in Berber l'ansart (Shloh, Ait Warain), l'ansart (Ait Nder, Ait Yusi, Ait Sadden), or t'ainsa (Temsaman).

On that day, or sometimes the evening before, smouldering fires are made in many different parts of Morocco.

[185] On the evening of Midsummer day the Ait Waryager make in their yards fires with poplar (asafsaf) leaves, pennyroyal, and barley straw, over which the people leap.

[187] Besides smoke and fire customs, water ceremonies are [188] frequently practised at Midsummer.

[515] [189] Among the Ait Waryager the people take their bath before sunrise, and those who refrain from doing so are supposed to remain unclean.

796 245 [190] "O God, pray for the sake of the Prophet, the chosen one; dust is better than male figs".

The last-mentioned phrase alludes to the custom, found at Midsummer in various northern tribes (Fahs, Andjra, Bni 'Aros, Temsaman, Ait Waryager), of hanging bunches of male figs in the female trees. This is said to prevent the fruit from dropping or to make it good, although it really serves as a means of fertilising the female figs by the aid of a very small hymenopter, Blastophaga grossorum, which lays its eggs in the interior of the figs. I was told by a scribe from the Rif that one insect is sufficient to make forty figs good by going in and out of them. The male figs hung in the female trees are wrapped up in straw, esparto (ariy; Ait Waryager), or pennyroyal (flaiyu; Andjra), the smell of which is considered good for the trees. The Rif Berbers and Andjra mountaineers also make a few cuts in the trunks of their fig trees so that the sap oozes out, in order to keep the tree from getting dry and the fruit from falling; and some of them, moreover, hang [754] oleander twigs in their fig trees as a charm against the evil eye. To protect their apple and pear trees from the same enemy, the people of Andjra on Midsummer day suspend from them stone weights stolen from the market-place or hang on them thistles (amgil) taken from the same place.

751 796 [192] The Ait Waryager on Midsummer day press the juice of a grape or two into their eyes to prevent their getting diseased; and in order to rid themselves of fleas they put a flea inside a grape and bury it in the dungheap (dazubait).

243 While barley is the predominant crop, maize is an important secondary one. Wheat and rye are also grown but the latter is held in low esteem as a food product[1] and the former does not grow successfully on the thin residual soil of the region. In 241 [312] those areas where there are rivers or streams, small gardens are maintained by irrigation canals. In these are cultivated potatoes, tomatoes, onions, garlic, squash, turnips, green peppers and mint.

245 In addition to the grains, maize, and small vegetable gardens, many households also have orchards of fruit and nut trees. Fig, lemon, orange, pomegranate, walnut, almond, and olive trees are common. In some areas grapes are also cultivated. Around each house is a grove of prickly pears which serves not only as a means of preserving privacy, but also as a source of food. These products not only supplement and add variety to the regular diet but in the case of oranges, almonds and grapes serve as cash crops. The olives are pressed by the [258] [262] women to provide crude cooking oil. Nuts, dried grapes and figs are an important winter food reserve. The work of pruning and [221] grafting goes on during the months of February-March-April.

243 In early summer harvesting begins. Both men and women engage in this activity, the men doing the reaping with hand

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[829] [1]Coon (1931:47-48) states that rye is highly praised by the Riffian but that since the Arabs scorn it as a foodstuff the Berbers are ashamed to admit its worth.

province of Nador, where barley is relatively cheap, in order to sell in the Rif, which seldom produces enough to meet local needs. The barley is stacked in huge piles of loose, unground seed which is purchased in relatively small lots to be taken back to the mountains and ground for bread or left in seed form to feed the livestock. The barley is measured and weighed by a member of the imziren class, who loudly cries out the current price of barley in the market. The merchants themselves sit under nearby shade trees, accepting the coins from their criers and listening to the competition.

In addition to these large-scale sellers, there are the large-scale buyers, who resemble the large-scale sellers in all particulars except their immediate function in the market. Among this group are the egg merchants who buy the tiny lots of a myriad fellah in order to transport them to the urban centers of Tetuan or Fez. Another group of buyers are the almond merchants who purchase the Riffian's supply to market abroad, usually in France, to cosmetic companies which transform them into face oils and hand lotions. There are also merchants of oranges who supply the canned juice industry, and grape buyers who purchase the indigenous supply (used locally by the Berbers as a winter reserve in the form of raisins) for the wine industry located in central Morocco.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

Relict Species

137 The vegetation of northern Morocco has not only been modified by man, but has also undergone progressive natural change. In the varied Moroccan flora, European, Asiatic, and tropical elements are found along with species endemic to the Mediterranean region. During the Pleistocene, the southward movement of a colder and wetter climate brought corresponding southward migrations of European and Euro-Siberian plants. Europe and Barbary were no longer linked by land bridges, but seeds could easily blow or float across the narrow Strait of Gibraltar. Relicts of these invasions are found today in the mountains of northern Morocco in growths of fir (*Abies pinsapo, A. tazaotana*) and deciduous oaks (*Quercus pyrenaica, Q. faginea*) that seem strangely out of place in northern Africa.[11] Other Pleistocene relicts include birch (*Betula alba*), two species of maple (*Acer monspessulanum, A. Opalus*), alder (*Alnus glutinosa*), and the mountain ash, or service tree (*Sorbus torminalis*).[12]

Enigma of the Oleaster

The olive tree (*Olea europaea*) has long been regarded as a symbol of the Mediterranean landscape. Since classical antiquity it has been recognized that not all olive trees are alike, that some grow without cultivation and produce small and bitter fruit. The "wild" olive, or oleaster, was long thought to be an endemic element of the Mediterranean flora and the ancestor of the cultivated tree. Victor [114] Hehn may have been the first to challenge this view on historical and philological grounds.[13] Today this problem is the subject of vigorous debate. Most authorities consider the oleaster to be a natural element of maqui, but some scholars, including August Chevalier, describe it as a "subspontaneous race," escaped from cultivation in ancient time.[14]

[245] In contrast to the common cultivated olive, the oleaster has four-angled thorny branches, broader leaves, and smaller fruit. Moreover, the oleaster, obviously, grows without cultivation or apparent care. None of these points proves that it is an ancestral wild race. As De Candolle remarks, "In a woody species which lives so long and shoots again from the same stock when cut off by accident, it is impossible to know the origin of the individuals observed."[15] To make matters worse, [245] it is a common practice in northern Morocco to graft scions of the cultivated olive to oleaster stock.[16]

The oleaster is best developed in the area covered by palmetto scrub, where the winters are too cold and wet for the cultivated race, but a few oleasters are seen

113 137 [11] Changes of climate also have been invoked to explain the presence of wild olive (*Olea Laperrini*) and cypress (*Cupressus Dupreziana*) in the mountains of the central Sahara. L. Lavauden, "Les Forêts du Sahara," *Rev. des Eaux et Forêts*, 65 (1927), 265–277.

[12] The adaptation of "Nordic" species to the Mediterranean environment is considered by Andrea Giacobbe in "Les effets écologiques de l'aridité du climat sur la végétation méditerranéenne: héliophilie et configuration morphologique des forêts," *Unesco Arid Zone Research*, V, "Plant Ecology" (Proceedings of the Montpellier Symposium) (Paris, 1955), pp. 64–66.

[13] Victor Hehn, *The Wanderings of Plants and Animals from Their First Home* (London: Swan Sonnenschein, 1888), pp. 88–101.

[14] Aug. Chevalier, "L'origine de l'olivier cultivé et ses variations," *Revue de Botanique Appliquée et d'Agriculture Tropicale*, 28 (1948), 1–25.

[15] Alphonse de Candolle, *Origin of Cultivated Plants* (New York: Appleton, 1885), p. 280.

[16] Pliny (*Natural History*, XVII, 30) thought that this practice was limited to Africa.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

in the semiarid region south of Melilla. Both varieties sprout vigorously, and both are polymorphic. The latter fact is of major significance, for if the oleaster were a wild species it should be monomorphic, at least in a given area. Chevalier's argument is based upon this point. The seemingly primitive oleasters may be escaped and neglected variants of races that were once cultivated.[11] The longevity of the olive is lengendary; some sprouts in Algeria and Tunisia are almost certainly derived from Roman trees.[12] The fact that some trees have spines and small fruit may not be distinctive. Both varieties probably evolved from *Olea chrysophylla*, the true wild olive of southwestern Asia.[13] The oleaster may be no more difficult to explain than the "wild" pears and apples in the forests of France. It is not unusual for a neglected cultivated plant to become naturalized. Subspontaneous varieties of the cultivated carob tree (*Ceratonia siliqua*) are common in the Mediterranean region. In northern Morocco this tree, cultivated for its edible pods, is widely scattered in the area covered by palmetto scrub. Like the oleaster, it often appears to be a natural element of the maqui.

Shrub Formations

In most of the Mediterranean basin, shrub formations now cover much more territory than do forests (fig. 8). In northern Morocco, shrub vegetation is dominated by dwarf palm or palmetto (*Chamaerops humilis*) and the xerophytic camel thorn (*Zizyphus lotus*). The range of these two species delimits two shrub formations, palmetto scrub and thorn scrub. The first formation is the *Oleo-Lentiscetum* (i.e., *Olea europaea—Pistacia lentiscus*) of most authors, but in northern Morocco neither of these plants is as conspicuous as the palmetto.

The palmetto (Arabic *doum*) is best developed on argillaceous soils in areas of mild temperature and moderate to heavy precipitation (fig. 7). These preferences explain the absence of palmetto in the cool highlands and its rare occurrence in semiarid areas. Dwarf palm may be seen on rocky knolls near Wad Moulouya, but most of the eastern half of northern Morocco is too dry for the species. In the western half of the zone the altitudinal limits of palmetto rise from west to east according to the lessening amount of precipitation.

The popular names "dwarf palm" and "palmetto" as well as the Linnaean binomial (*Chamaerops humilis*), derived from Greek and Latin roots meaning "dwarf or stunted bush," do not suggest that this plant may grow five to ten meters high. Excellent specimens of this height are preserved, however, at the cemeteries of Chella near Rabat and at Asni south of Marrakech. In northern Morocco I have seen tall palmettos on several sacred sites. Palmetto is exploited

[TEXT CONTINUED ON PAGE 25]

[11] H. Camps-Fabrer, *L'Olivier et l'huile dans l'Afrique romaine* (Algiers: Service des Antiquités, 1953), p. 11, states that charcoal from a midden near Tébessa in eastern Algeria "a révélé d'une manière certaine l'existence de l'oléastre en Afrique au Paléolithique Supérieur." But in the study to which she refers—R. le Du and L. Saccardy, "Etude de quelques charbons préhistoriques de la région de Tébessa," *Rev. Africaine*, 88 (1949), 111–119—there is no mention of oleaster. Charcoal of *Phillyrea*, another genus of the olive family, is mentioned, but this adds nothing to the history of *Olea europaea*.

[12] L. Joleaud, "L'ancienneté de la fabrication de l'huile en Afrique du Nord," *Rev. Africaine*, 70 (1929), 19–36.

[13] If this be correct, the present range of the cultivated olive is almost completely separated from that of its ancestor. I. H. Burkill, "Habits of Man and the Origins of the Cultivated Plants of the Old World," *Proc. Linnean Soc. London*, 164 (1951–1952), 12–42, ref. to fig. 2, p. 16.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2
Senhaja MX4

tradition that rye could be grown on unclaimed land, beyond the reaches of ordinary agriculture.[4]

Hunger or plenty depends largely upon the success or failure of the cereal crop. Tree and garden crops supplement but never supplant the cereals. The most important secondary crops are from fruit and nut trees, which are especially numerous in the western part of the Rif. The most important are the olive, pomegranate, fig, and walnut. Apples and plums are grown by some of the highland tribesmen, who graft them on hawthorns. At lower elevations, especially on south-facing slopes, orange, peach, and apricot trees are occasionally seen.

Dried figs and raisins are second only to the cereals as staple foods. The importance of the trees is indicated by the complicated pattern of their ownership. On a given farm, all the trees may belong to an outside party, perhaps the former owner of the land who refused to relinquish title to his trees. One tree may be owned by several people in partnership, and sometimes different people own different branches, or claim parts of the crop on the ground. At one time the Rifians seem to have used grapes or other fruits to make fermented beverages, for Leo Africanus describes them as being "so excessively given to drink, that they scarcely reserve wherewithal to apparel themselves."[5]

Irrigated plots in the valleys of Wad Ghis and Wad Nkour produce broad beans, chickpeas, potatoes, onions, tomatoes, peppers, carrots, turnips, and squash. Add eggs, and an occasional feast of mutton or goat meat, and you have the main ingredients of the Rifian diet. In recent years fish have been brought in from Alhucemas to the principal rural markets. Fish are regarded as a delicacy, and are usually fried and eaten in the market place.

West of the Rif the dietary situation improves, but it becomes more hazardous toward the east. This distinction is based on the differences in precipitation and runoff. In the eastern lowlands, precipitation is too meager for vines and figs, and extensive irrigation is possible only in the valleys of Wad Kert and Wad Moulouya. The tribesmen of Garet suffer from acute want in any unusually dry year, and most adults remember at least one famine. Garet and Gal'aya are northern Morocco's main areas of emigration.

In the Sanhajan highlands and in most of Ghmara and Jbala, each hamlet has a reliable source of irrigation water. The main irrigated crops are maize, beans, and squash. The planting of beans between the rows of maize may indicate an unformulated appreciation of the value of pulses as restorers of the nitrogen content of the soil. Perhaps not; for the plants in this New World combination seem to have been introduced as one complex by Andalusian refugees.

In most of the central highlands, and especially in Sanhaja as-Srair, *kif*, or hemp (*Cannabis sativa*), is an important cash crop. It is grown under irrigation during the summer, and is usually planted and harvested at about the same time as maize. After it has been reaped, the stems of the plant are submerged in a stream and held down with stones. After two or three days of soaking, the fibers are separated and used to make cord, mats, and baskets.

Traveling from the central highlands toward the Atlantic lowlands, one notes

[4] C. S. Coon, "Tribes of the Rif," *Harvard African Studies*, 9 (1931), 47–48.

[5] Leo Africanus, *The History and Description of Africa* (London: Hakluyt Society, 1896), II, 516.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2

R 256 171 [423]

Mills of this type are usually privately owned, and the owner collects one-tenth of the flour. When there is neither hand nor turbine mill, the women pound the grain with iron bars.

R 245 409 171

The implements used to press and pulp olives are similar to those used in Roman time.[10] The apparatus consists of a mill, a press, and a vat. The millstone lies against a centrally placed revolving post and is turned by means of a horizontal shaft with one end secured in the center post and the other projecting beyond the stone (fig. 23). Mills are used both for bruising the fruit before pressing and later to pulp the pressed fruit for use as cattle fodder. The larger mills are powered by animals, the smaller by hand. The essential part of the press is a large log, held in place by heavy wooden screws, which is forced down on baskets filled with olive mash.

R 412 J [412]

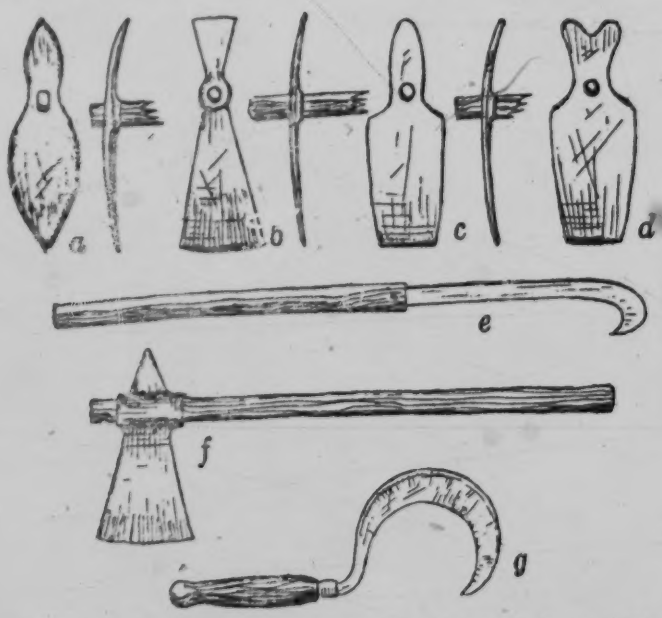

Fig. 21. Farm implements: *a*, *b*, *c*, *d*, digging and weeding tools; *e*, grubbing and cutting tool; *f*, hatchet used by woodcutters; *g*, sickle.

R 245 409 171

Role of Domestic Animals

R 231 171

In the statistical report of 1953 the number of domestic animals in Spanish Morocco is given as 1,104,000 goats, 661,000 sheep, 337,000 cattle, 55,000 donkeys, 22,000 mules, and 2,000 camels.[11] The number of goats nearly equals that of human beings. They are kept for their meat, milk, and hides. In many areas the number of goats is limited only by the amount of space available for storage of fodder and by the number of goatherds.

R [173]

[10] H. Campa Fabrer, *L'Olivier et l'huile dans l'Afrique romaine* (Algiers: Service des Antiquités, 1953).

[11] *Anuario estadistico, 1952–53*, p. 131, cited in note 1.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Senhaja MX4

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Fig. 22. Turbine grist mill.

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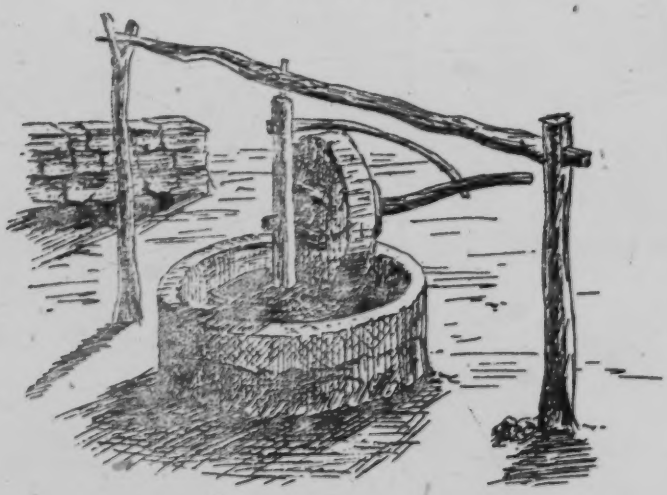

Fig. 23. Olive grinder.

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and by the number of goatherds. The situation in Ktama is representative of the entire highland area. In 1934 this mountain tribe, with a population of 8,389 persons, maintained 20,259 goats in an area of 450 square kilometers.[14] Goats must be brought back to shelter each night; so the radius of their movement is small. The effects of browsing on vegetation will be examined in chapter viii.

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The number of goats decreases toward the Atlantic lowlands and the plains

[14] Figures from an unpublished report of the Spanish *interventor* dated November, 1934.

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[Village of Ubed 'Abd al-Mumin]

had died by the rifle, and many of their brothers as well. Some provision must be made for young widows and their helpless children. To the human population of fifty-seven was added an animal roster of one hundred and twenty-five head: 10 cows, 1 calf, 15 sheep, 80 goats, 1 donkey, 2 mules, and 16 dogs. Six of the men owned the goats, and one the sheep; three men had none. Each man, however, owned a cow, for all needed milk.

There were a total of 923 food-bearing trees—more than 16 to a person, or 92 to a family. These were divided as follows: almonds, 525; figs, 272; olives, 71; pomegranates, 33; apricots, 16; oranges, lemons, and walnuts, 2 of each. Every man owned at least 4 almond, 15 fig, and 3 olive trees. Dried almonds and figs are absolutely necessary to sustain life in late winter once the grain has been eaten, while olive oil is the essential fat. The other kinds of trees produce useful fruits, but the Riffians can get along without them.

In these high valleys arboriculture is the main business of the people, and they prune, water, graft, and fertilize their trees with extreme care. Compared to this activity the Riffian spends but little time in his fields; he owns enough tillage for only about four weeks' plowing time a year, with a range of from twenty to forty-five days among the ten men. Those who have little are hired to work for those who have more, on the ancient system of granting a fifth to the plowman. Work on the vegetable gardens rates a fourth, while he who cares for another man's trees receives a third of the fruit, aside from windfalls which are for women, children, and the poor.

Unfruitful trees have long ago been felled to make way for the silver-leaved olives and the lofty walnuts. Up high on the ridges to either side one can still cut cedar and even a few pine. Below the man-made tree line is a zone of brushy goat pasture, and below this, but still steep, the vineyards. Here the families gather in September to pick the grapes, which they dry into raisins to be eaten with the figs and almonds. Up the valley a way there are two public installations, a small turbine water mill of familiar appearance, which belongs to the grandsons of its builder, and an olive press, which serves several villages. This olive press is actually near the center of another village, inhabited by holy people who never fight. Their holiest member regulates the protocol of olive pressing, aside from serving as imām to lead the Friday prayer, in which the grown men of all the villages of that part of the valley participate.